

## 科學與社會 -- 科學與社會的互動

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科學與社會 Nature Magazine 的 AlphaGo Zero paper 科學與社會的互動 [1]

科學與社會 Alpha 科學與社會的互動 leukotomy 科學與社會的互動

科學

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科學與社會的互動 talent pool 科學與社會的互動

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科學 Karl Raimund Popper 科學與社會的互動

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科學與社會的互動 STEM (science, technology, engineering and mathematics) 科學與社會的互動

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科學與社會的互動 “科學與社會” 科學與社會的互動

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Deepmind [2]

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AlphaGo Master    AlphaGo Master    AlphaGo Master  
AlphaGo Zero    AlphaGo Master    AlphaGo Master

AlphaGo Zero 3000 AlphaGo Master 3000 AlphaGo Zero 1000000[3] 1000000  
AlphaGo Master 1000000000 16 1000000 AlphaGo Zero 1000000000 18 1000000  
AlphaGo Zero 14 16 45 1000000000000

1. Nature Magazine AlphaGo Deepmind AlphaGo Zero AlphaGo Master

2) AlphaGo Zero local trap  
AlphaGo Zero Alpha  
Alpha

[AlphaGo Zero](#) [AlphaGo Master](#) [AlphaGo Master](#) [AlphaGo Master](#) [4] [Nature Magazine](#) [AlphaGo Zero paper](#) [AlphaGo Master](#) [deep-learning](#)

AlphaGo Zero AlphaGo Master AlphaGo Master

AlphaGo Zero [5] game

[illegible]

superhuman Technological Singularity  
Demis Hassabis AlphaGo

[illegible]

AlphaGo Zero AlphaGo Zero superhuman [7] superhuman

superhuman 深度學習強化學習 superhuman 問題

AlphaGo Zero AlphaGo Master AlphaGo Master superhuman AlphaGo Master 60 3 AlphaGo Master superhuman AlphaGo Master AlphaGo Zero superhuman superhuman [8]

Alpha Alpha

Alpha Turing Machine deep-learning Alpha Deepmind AlphaGo Zero AlphaGo Master AlphaGo Zero AlphaGo Zero

Deep-learning credit reinforcement credit reinforcement local trap

leukotomy reinforcement peer review Socratic method peer review Socratic method peer review

ideas are cheap idea cheap reinforcement [9]

AlphaGo reinforcement

[10]

[11]

[12]

Turing Machine local trap Universal approximation



2) leukotomy Leukotomy BRAIN Initiative AlphaGo

3) personality intelligence Walter Freeman personality intelligence

BRAIN Initiative project NIH BRAIN 2025 Report “there is general agreement that types can be defined provisionally by invariant and generally intrinsic properties” invariant agreement insights “envision an integrated, systematic census of neuronal and glial cell types” dynamic brain mapping “Link brain activity to behavior” “Produce conceptual foundations for understanding the biological basis of mental processes” mental processes behavior

BRAIN Initiative project personality intelligence brain mapping personality intelligence hidden assumptions

personality intelligence

BRAIN Initiative project brain mapping mental diseases personality intelligence personality intelligence leukotomy

leukotomy Alpha

personality intelligence mental diseases

BRAIN Initiative brain mapping human level intelligence personalities intelligence mental diseases BRAIN Initiative neurosciences AlphaGo generic human intelligence Alpha neurosciences [18]

AlphaGo Master AlphaGo Zero AlphaGo AlphaGo Master Alpha

Alpha

Technological Singularity BRAIN Initiative project

[illegible]

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Deepmind Alpha Nature Magazine Alpha

[7] <http://www.alphago-games.com/> Full Strength of Alphago Zero, i.e. Final Form 40 Blocks 20 Blocks Not Full Strength of Alphago Zero Alphago Zero superhuman

[8]

[9] 2012 "Show, don't tell" Socratic method tell and discuss

Ideas are cheap

[10] "Go gaming is strictly defined within a very small space. Industrial automations are typically designed in well controlled environments, but not strictly defined. Car driving is regulated, but the environment is not well controlled"

[11] Alpha AlphaGo Master 60+3

[12]

Alpha

[13] AlphaGo Master AlphaGo AlphaGo Alpha

[14] Dialogue Concerning the Two Chief Word Systems Socratic Method

AlphaGo

[18]  $\alpha$  Alpha